

# Fisher™ A11 High-Performance Butterfly Valve CL900-2500

## Contents

Introduction .....	1
Scope of Manual .....	1
Description .....	2
Specifications .....	2
Installation .....	4
Adjusting the Travel Stops .....	5
Preparing for Installation .....	5
Valve Orientation .....	6
Installing the Valve .....	7
Packing Adjustment and Shaft Bonding .....	9
Maintenance .....	10
Removing the Valve .....	11
Packing Maintenance .....	11
Seal Maintenance .....	14
Soft Seal Installation .....	15
Metal and Phoenix III Seal Installation .....	16
Cryogenic Seal Installation .....	17
Valve Shaft/Disk Pin Unit Maintenance .....	18
Bearing Maintenance .....	19
Parts Ordering .....	20
Parts List .....	20

Figure 1. Fisher A11 Valve



W9570-1

## Introduction

### Scope of Manual

This instruction manual includes installation, maintenance, and parts information for the Fisher A11 High-Performance Butterfly Valves (figure 1) in CL900 and 1500. For CL2500 valves, contact your [Emerson sales office](#).

For information about the actuator and accessories, please refer to the separate instruction manuals for these items.

Do not install, operate, or maintain an A11 valve without being fully trained and qualified in valve, actuator, and accessory installation, operation, and maintenance. To avoid personal injury or property damage it is important to carefully read, understand, and follow all of the contents of this manual, including all safety cautions and warnings. If you have any questions about these instructions, contact your Emerson sales office before proceeding.

## Description

A11 High-Performance Butterfly Valves are available in a lugged body design, with a variety of seal, valve body, and internal components. These valves feature a dynamic sealing design that is used in a variety of demanding applications.

## Specifications

Specifications are listed in table 1 and the specifications for a given valve are stamped on a nameplate attached to the valve.

## Educational Services

For information on available courses for the A11 High Pressure valve, as well as a variety of other products, contact:

Emerson Automation Solutions  
Educational Services - Registration  
Phone: 1-641-754-3771 or 1-800-338-8158  
E-mail: [education@emerson.com](mailto:education@emerson.com)  
[emerson.com/fishervalvetraining](http://emerson.com/fishervalvetraining)

Table 1. Specifications

<p><b>Available Configurations</b></p> <p>Valve Sizes Class 900 and 1500<sup>(1) (2)</sup>: Size ■ 3, ■ 4, ■ 6, ■ 8, ■ 10, ■ 12, ■ 14, ■ 16, ■ 18, ■ 20 and ■ 24-inch</p> <p>Valve Body: Lugged style in Class ■ 900 and ■ 1500</p> <p>Consult your <a href="#">Emerson sales office</a> for other sizes and pressure classes</p> <p><b>Maximum Inlet Pressure</b></p> <p>Consistent with applicable ASME class pressure/temperature ratings per ASME B16.34 unless such ratings are limited by material temperature capabilities.</p> <p><b>Construction Materials</b></p> <p>Refer to Bulletin 56.1:A11 CL900-2500 High-Performance Butterfly Valve (<a href="#">D104222X012</a>)</p> <p><b>Disk Rotation</b></p> <p>Clockwise (CW) to close</p> <p><b>Shutoff Classification per ANSI/FCI 70-2 and IEC 60534-4</b></p> <p>Class VI Soft Seal: Bubble-tight shutoff (exceeds Class VI) High Pressure Seal: Standard Class V</p>	<p>Cryogenic Seal (Reverse direction only) <i>CTFE with Aluminum Backup Ring: Class VI</i> Consult Emerson sales office for other shutoff classifications</p> <p><b>Valve Body Classification</b></p> <p>Valve bodies are designed for installation between standard pipe flanges: for 3 inch through 24-inch sizes (ASME B16.5)</p> <p><b>Approximate Weights</b></p> <p>See table 2</p> <p><b>Actuator Types Available</b></p> <ul style="list-style-type: none"> <li>■ Locking-lever manual actuators, ■ worm-gear manual actuators, ■ spring-return pneumatic actuators, ■ double-acting pneumatic actuators, and</li> <li>■ electric actuators</li> </ul> <p><b>ENVIRO-SEAL™ Packing</b></p> <p>This optional ■ PTFE or ■ graphite packing system provides improved sealing, guiding, and transmission of loading force to control liquid and gas emissions (see figure 9). See Bulletin 59.3:041 ENVIRO-SEAL Packing Systems for Rotary Valves (<a href="#">D101638X012</a>) for more information. Contact your Emerson sales office for larger sizes; they may require a special valve body.</p>
---	---

NOTE:

1. Sizes NPS 3 and 4 are CL900 bodies with CL600 internals.
2. Sizes NPS 3 and 4 are CL1500 bodies with CL600 internals. Sizes NPS 6 and 8 are CL1500 bodies with CL900 internals.

Table 2. Approximate Weight for Size 3 through 24-Inch Valves

VALVE SIZE	CLASS	
	900	1500
kg		
3	---	---
4	---	---
6	59	---
8	120	---
10	210	311
12	450	663
14	444	810
16	513	1152
18	703	1613
20	991	2250
24	1626	---
lbs		
3	---	---
4	---	---
6	130	---
8	264	---
10	463	685
12	993	1462
14	976	1785
16	1132	2540
18	1550	3555
20	2185	4960
24	3590	---

## Installation

### **⚠ WARNING**

Always wear protective gloves, clothing, and eyewear when performing any installation operations to avoid personal injury.

Check with your process or safety engineer for any additional measures that must be taken to protect against process media.

If installing into an existing application, also refer to the WARNING at the beginning of the Maintenance section in this instruction manual.

### **Note**

When installing a valve after it has been in long-term storage, cycle the valve at least ten times to re-energize the dynamic seal. Please contact your [Emerson sales office](#) if you have any questions about preparing a valve for storage or if you are planning to put into service a valve that has been stored for some time.

## Adjusting the Travel Stops

### CAUTION

When using manual or power actuators, adjust the actuator travel stops so the disk stop in the valve body does not absorb the output of the actuator.

For actuators without travel stops, the actuator must be properly mounted to prevent it from driving the valve disk against the valve disk travel stop.

Failure to limit actuator travel as described in this section can result in damage to the valve shafts or other valve parts

### Note

An "S" is visible on both the valve shaft and valve body. When the valve disk is closed, the "S" on the shaft aligns with the "S" on the valve body.

1. Locate the actuator travel stop that establishes the closed position of the valve disk. When adjusting the travel stop make sure that the disk is from 0 to 0.76 mm (0 to 0.030 inch ) away from the internal stop in the valve body. This adjustment is necessary to be certain that the actuator output torque is fully absorbed by the actuator travel stop rather than the stop in the valve body.

For actuators without travel stops, the actuator must be properly mounted to prevent it from driving the valve disk against the valve disk travel stop.

2. To mount an actuator without travel stops, first, if necessary, remove the actuator from the valve. Then, position the valve disk from 0 to 0.76 mm (0 to 0.030 inch) away from the internal stop in the valve body.
3. Now, travel the actuator to the maximum position. Keep the actuator in the maximum travel position. Return the actuator to the valve, taking care not to disturb the position of the valve disk.
4. Mount the actuator on the valve using proper bolts with locking washers to achieve a secure fit.
5. Before installing the valve/actuator assembly in the process line, cycle the valve several times to be sure the valve disk returns to the proper position.

## Preparing for Installation

### ⚠ WARNING

If the A11 valve is equipped with a fail-open actuator, remove the actuator before installing the valve/actuator assembly or cycle the valve into the fully closed position. Then, to avoid possible personal injury or property damage, take appropriate steps to ensure that the actuator does not cause the valve to open during installation.

1. If the valve and actuator have been purchased separately or if the actuator has been removed for storage, travel stop adjustment, or maintenance, mount the actuator before inserting the valve/actuator assembly into the line. Refer to the actuator instruction manual for mounting and adjustment procedures.

### CAUTION

To avoid product damage, inspect the valve before installation for any damage or any foreign material that may have collected in the valve body. Also remove any pipe scale, welding slag, or other foreign material from the pipeline.

- Remove the protective end covers from the valve and inspect the valve body to be certain that it is free of foreign material. Also, be certain that adjacent pipelines are free of any foreign material, such as pipe scale or welding slag that could damage the valve seating surfaces.

### **⚠ WARNING**

The A11 valve is designed for use with the appropriate piping schedule for the ASME class. However, before putting the valve into operation, measure carefully to ensure disk rotation without interference from piping or flanges. Be certain to center the valve accurately to prevent interference of the disk with the flanges.

The edges of a rotating disk have a shearing effect that may result in personal injury. To help prevent such injuries, stay clear of the disk edges when rotating the disk.

Damage to the disk will occur if any pipe flanges or piping connected to the valve interfere with the disk rotation path. Compare the disk chordal swing diameter from the dimensional tables in Bulletin 51.6:A11 CL900-2500 A11 High Performance Butterfly Valve ([D104222X012](#)) to the ID of the pipe to be certain the disk rotates without interference before putting the valve into operation. Consult with your [Emerson sales office](#) for any constructions not listed in the bulletin.

- Select the appropriate gaskets for the application. flexible graphite, spiral wound, or other gasket types, made to ASME B16.5 group or user's standard, can be used on A11 valves depending on the service conditions of the application. Note: spiral wound gaskets, when properly centered, will cover more than 60 percent of the gasket area at the retaining ring screws.

For metal-seated and cryogenic valve gasket recommendations, please contact your Emerson sales office.

- Refer to the appropriate table for the quantity and size of flange bolts required (table 3) and proceed with the following instructions.

## Valve Orientation

A11 valve bodies are designed for installation with the shaft in any orientation around the pipeline: horizontal, vertical, or at an angle. However, when installing an A11 valve, please follow these recommendations.

Table 3. Cap Screw Data for Lugged Valves

CL900/600	
Valve Size, NPS	4
Number of Cap Screws	16
Size-Diameter Inch - Thread	1-1/8 - 8
B-Length of Cap Screw, Inch	3.38

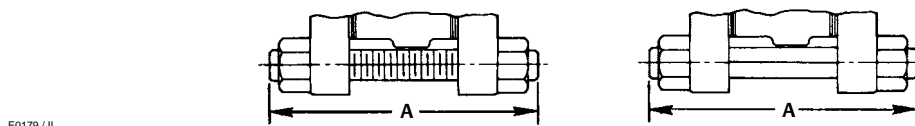
CL900									
Valve Size, NPS	6	8	10	12	14	16	18	20	24
Number of Cap Screws	24	24	32	40	40	40	40	40	40
Size-Diameter Inch - Thread	1-1/8 - 8	1-3/8 - 8	1-3/8 - 8	1-3/8 - 8	1-1/2 - 8	1-5/8 - 8	1-7/8 - 8	2 - 8	2-1/2 - 8
B-Length of Cap Screw, Inch	3.63	4.25	4.63	5	5.32	5.75	6.38	6.75	8.5

CL1500/600	
Valve Size, NPS	4
Number of Cap Screws	16
Size-Diameter Inch - Thread	1-1/4 - 8
B-Length of Cap Screw, Inch	3.88

CL1500/900		
Valve Size, NPS	4	8
Number of Cap Screws	24	24
Size-Diameter Inch - Thread	1-3/8 - 8	1-5/8 - 8
B-Length of Cap Screw, Inch	5.13	6

CL1500						
Valve Size, NPS	10	12	14	16	18	20
Number of Cap Screws	24	32	32	32	32	32
Size-Diameter Inch - Thread	1-7/8 - 8	2 - 8	2-1/4 - 8	2-1/2 - 8	2-3/4 - 8	3 - 8
B-Length of Cap Screw, Inch	6.63	7.38	8	8.75	9.63	10.5

Figure 2. View of Stud Bolts



E0179 / IL

- In certain services (process fluids with high concentrations of entrained solids, abrasive slurries, or polymerizing media), valve performance will be enhanced by installing the valve with the shaft horizontal to the pipeline.
- Valves supplied for unidirectional shutoff should be installed with the high pressure at the back (shaft side) of the disk. A flow tag with an arrow is provided for proper installation.

The High Performance Butterfly Valve is designed to allow flow in either direction when in the open position. When in the closed position, high pressure should be applied to a specific side of the disk to provide best performance and optimal service life.

- Valves supplied for bidirectional shutoff, such as soft seal constructions, under normal operating conditions can (at different times) experience pressure in both directions; the highest of the two pressures should be exerted on the preferred side of the disk. If the two pressures are equal, then the one lasting the longest period of time should be applied to the preferred side. A flow tag with an arrow is provided for proper installation.

If you have questions about proper valve orientation in a specific application, contact your [Emerson sales office](#).

## Installing the Valve

### **▲ WARNING**

Always wear protective gloves, clothing, and eyewear when performing any installation operations to avoid personal injury.

To avoid personal injury or property damage resulting from the sudden release of pressure, do not install the valve assembly where service conditions could exceed the limits given in this manual, the limits on the appropriate nameplates, or the matching pipe flange rating. Use pressure-relieving devices as required by government or accepted industry codes and good engineering practices.

Check with your process or safety engineer for any additional measures that must be taken to protect against process media.

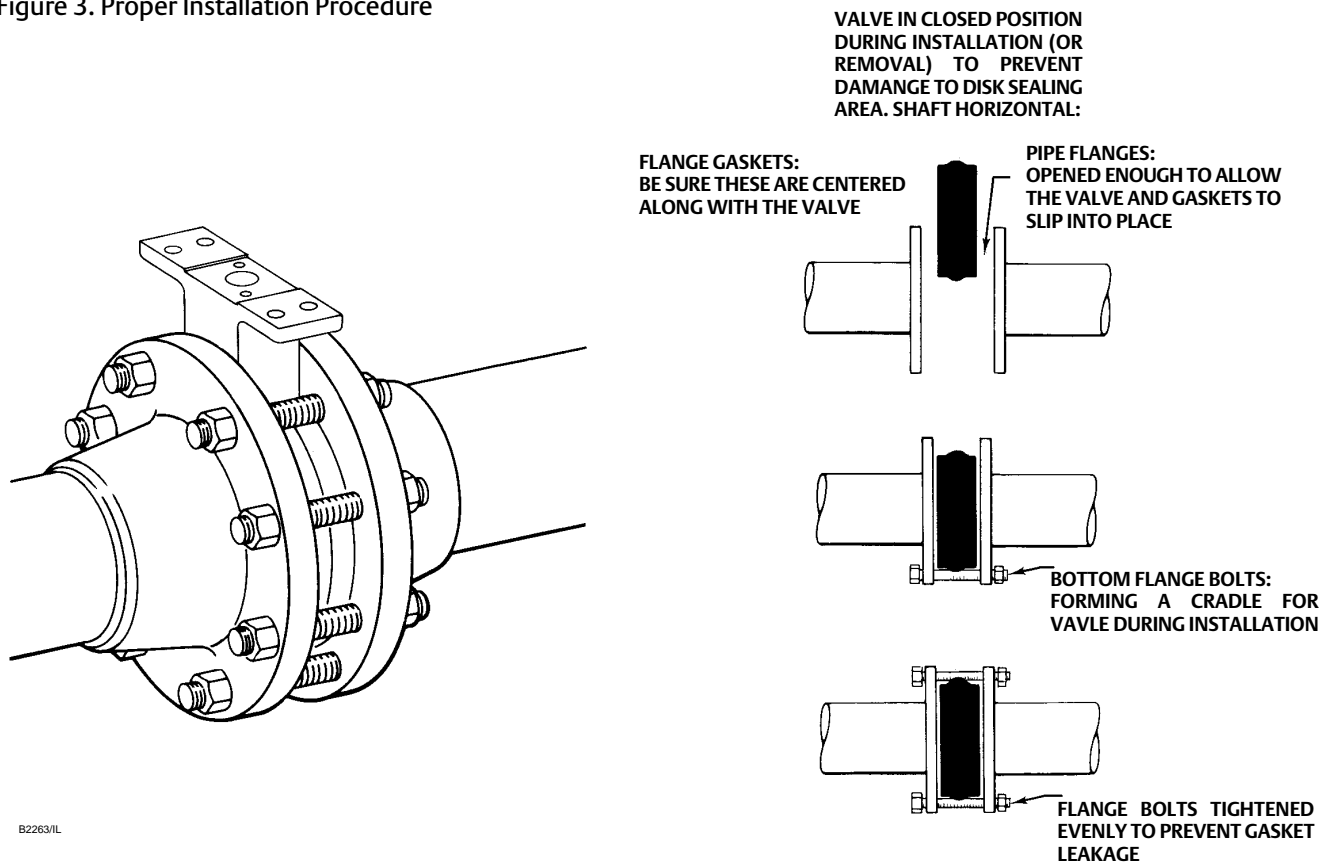
If installing into an existing application, also refer to the WARNING at the beginning of the Maintenance section in this instruction manual.

## CAUTION

When ordered, the valve configuration and construction materials were selected to meet particular pressure, temperature, pressure drop, and controlled fluid conditions. Responsibility for the safety of process media and compatibility of valve materials with process media rests solely with the purchaser and end-user.

Because some valve/body trim material combinations are limited in their pressure drop and temperature ranges, do not apply any other conditions to the valve without first contacting your [Emerson sales office](#).

Figure 3. Proper Installation Procedure



### For Lugged Valves:

1. Position the valve between the flanges. Be sure to leave enough room for the flange gaskets; then install the lower flange bolts.
2. Install the gaskets and align the valve and the gaskets.
3. Install the remaining bolts.
4. Tighten the flange bolts in an alternating criss-cross fashion to a torque value of one-fourth of the final bolting torque. Repeat this procedure several times increasing the torque value each time by a fourth of the final desired torque. When the final torque value has been applied, tighten each flange bolt again to allow for gasket compression.



## Packing Adjustment and Shaft Bonding

### **⚠ WARNING**

**Personal injury could result from packing leakage. Valve packing was tightened before shipment; however, the packing might require some readjustment to meet specific service conditions. Check with your process or safety engineer for any additional measures that must be taken to protect against process media.**

1. For PTFE or graphite packing: Tighten standard packing follower nuts only enough to prevent shaft leakage. Excessive tightening of packing will accelerate wear and could produce higher rotating friction loads on the valve shaft. If necessary, refer to the Packing Maintenance section.
2. For ENVIRO-SEAL Packing Systems: These packing systems will not require this initial re-adjustment. Refer to the separate ENVIRO-SEAL Packing System for Rotary Valves Instruction Manual ([D101643X012](#)).
3. For hazardous atmosphere or oxygen service valves, read the following Warning, and provide the bonding strap assembly mentioned below if the valve is used in an explosive atmosphere.

### **⚠ WARNING**

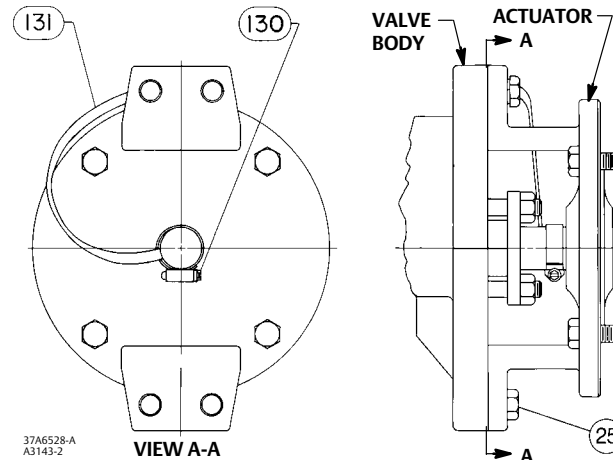
**The valve drive shaft is not necessarily grounded to the pipeline when installed. Personal injury or property damage could result, if the process fluid or the atmosphere around the valve is flammable, from an explosion caused by a disk's charge of static electricity from the valve components. If the valve is installed in a hazardous area, electrically bond the drive shaft to the valve body.**

#### **Note**

The packing is composed of all conductive packing rings (graphite ribbon packing) or partially conductive packing rings (carbon-filled PTFE female adaptor with PTFE V-ring packing or graphite-composition packing ring with PTFE/composition packing) to electrically bond the shaft to the valve for hazardous area service. For oxygen service applications, and hazardous area service where the standard packing doesn't provide sufficient shaft-to-valve body bonding, provide alternate shaft-to-valve body bonding according to the following step.

4. Attach the bonding strap assembly (key 131, figure 4) to the shaft with the clamp (key 130, figure 4).
5. Connect the other end of the bonding strap assembly to the valve flange cap screws.
6. For more information, refer to the Packing Maintenance section below.

Figure 4. Optional Shaft-to-Body Bonding Strap Assembly



## Maintenance

Valve parts are subject to normal wear and must be inspected and replaced as necessary. The frequency of inspection and replacement depends upon the severity of service conditions.

### ⚠ WARNING

Avoid personal injury from sudden release of process pressure. Before performing any maintenance operations:

- Disconnect any operating lines providing air pressure, electric power, or a control signal to the actuator. Be sure the actuator cannot suddenly open or close the valve.
- Use bypass valves or completely shut off the process to isolate the valve from process pressure. Relieve process pressure on both sides of the valve. Drain the process media from both sides of the valve.
- Vent the power actuator loading pressure.
- Use lockout procedures to be sure the above measures stay in effect while you work on the equipment.
- Always wear protective gloves, clothing and eyewear when performing any maintenance operations to avoid personal injury.
- The valve packing area may contain process fluids that are pressurized, *even when the valve has been removed from the pipeline*. Process fluids may spray out under pressure when removing the packing hardware or packing rings.
- Check with your process or safety engineer for any additional measures that must be taken to protect against process media.

### CAUTION

When using an actuator, the actuator travel stop (or actuator, for actuators without adjustable stops) must be adjusted so the disk stop in the valve does not absorb the output of the actuator. Failure to limit the actuator travel can result in damage to the valve, shaft(s), or other valve components.

## Removing the Valve

### **⚠ WARNING**

Using the procedures listed in the above WARNING, loosen the flange bolting that holds the valve. Make sure the valve cannot slip or twist while the bolting is being loosened and removed.

For field repair, remove the valve from the pipeline.

### **CAUTION**

Damage to the disk can occur if the disk is not closed when the valve is being removed from the pipeline. If necessary, stroke the actuator to place the disk in the closed position while removing the valve from the pipeline.

7. Before removing the valve from the pipeline, make sure the valve disk is closed. See figure 3. Rotate the shaft clockwise until the disk makes contact with the internal stop or actuator travel stop (if still installed). The “S” stamped on the shaft should be aligned with the “S” on the valve body.
8. After removing the valve from the pipeline, move it to an appropriate work area. Remove the actuator from the valve.

## Packing Maintenance

The A11 valve is designed so the shaft packing can be replaced without removing the valve from the process pipeline.

### **CAUTION**

The packing flange should be tightened only enough to prevent shaft leakage. Excessive tightening will only accelerate wear of the packing and could produce higher torques on the valve.

In most cases, packing leakage can be eliminated by merely tightening the hex nuts located above the packing flange while the valve is in the pipeline. However, if leakage continues, the packing must be replaced.

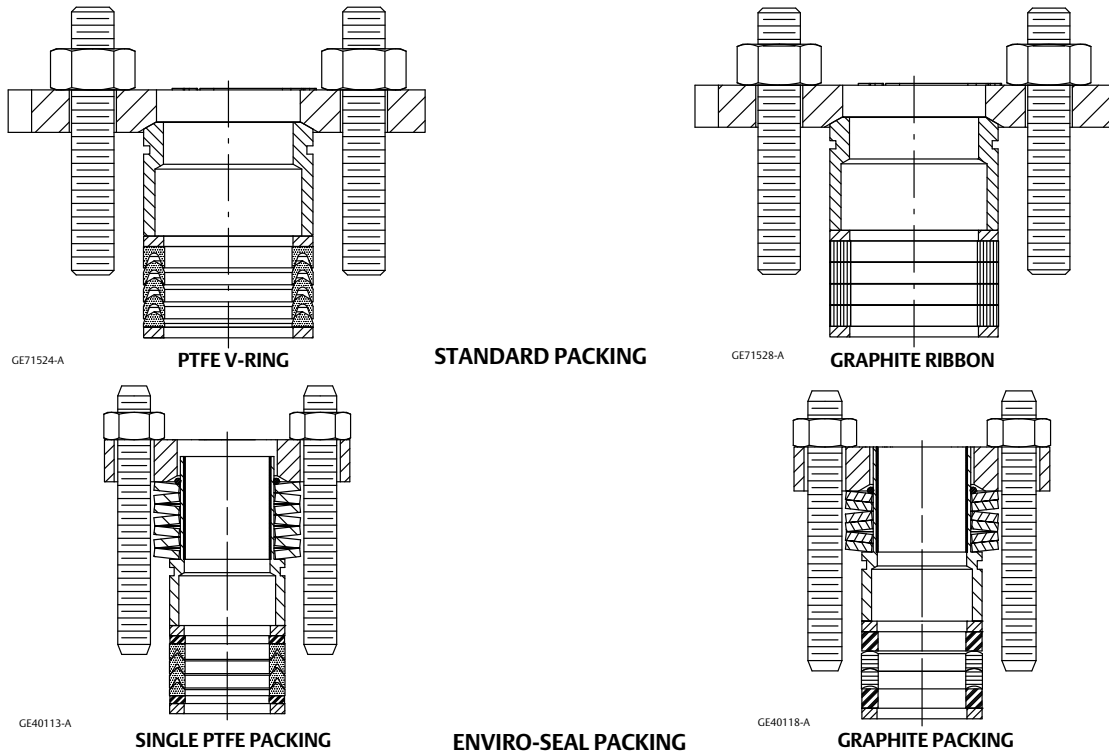
1. Before loosening any parts on the valve, be sure the pipeline has been depressurized. Then, remove packing nuts (key 16), lift off the packing flange (key 12) and packing follower (key 13). The packing (key 14) is now accessible.
2. Use a packing extractor to remove packing. Insert the corkscrew-like end of the tool into the first piece of packing and firmly remove. Repeat this process until all has been removed.

### **CAUTION**

Be careful when cleaning the packing bore. Scratches to the valve shaft (key 4) or inside diameter of packing bore may cause leakage.

3. Before installing new packing, clean the packing bore.
4. Install new packing one ring at a time, using the packing follower as a driver. If split packing is used, stagger seams every 90°.
5. Reinstall the packing follower and packing flange, secure nuts, and tighten as needed.

Figure 5. Standard Packing Configurations

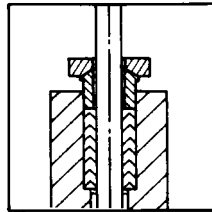


Note:  
1 With conductive packing, the female adaptor in PTFE v-ring packing is carbon-filled PTFE.

Figure 6. 7-Ring, Reverse, Leak-off, and Lubricated Packing Configurations

THE FOLLOWING PACKING CONFIGURATIONS ARE AVAILABLE FOR SPECIFIC APPLICATIONS:

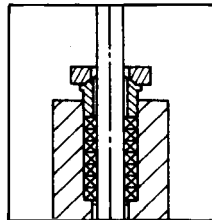
CODE 1: PTFE STANDARD ON SOFT SEATED AND CRYOGENIC VALVES



STANDARD 'V' TYPE PACKING

CODE 2: GRAPHITE STANDARD ON METAL SEATED AND FIRE SAFE VALVES

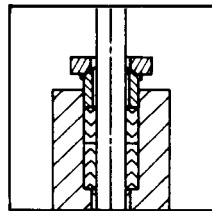
CODE 3: PTFE STANDARD ON SOFT SEATED VALVES



STANDARD SQUARE TYPE JAM PACKING

CODE 4: PTFE

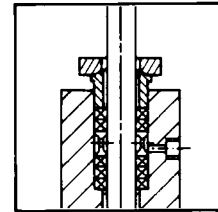
TO BE USED IN VACUUM SERVICE BELOW 20 MICRONS



STANDARD REVERSE 'V' TYPE PACKING

CODE 5: GRAPHITE

CODE 6: PTFE

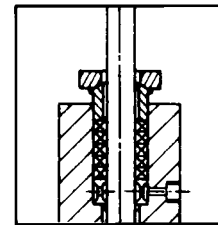


STANDARD SQUARE TYPE JAM PACKING WITH LANTERN RING/ BLEED OFF CONNECTION

CODE 7: GRAPHITE

CODE 8: PTFE

TO BE USED WHEN BEARING GREASE CONNECTIONS ARE REQUIRED

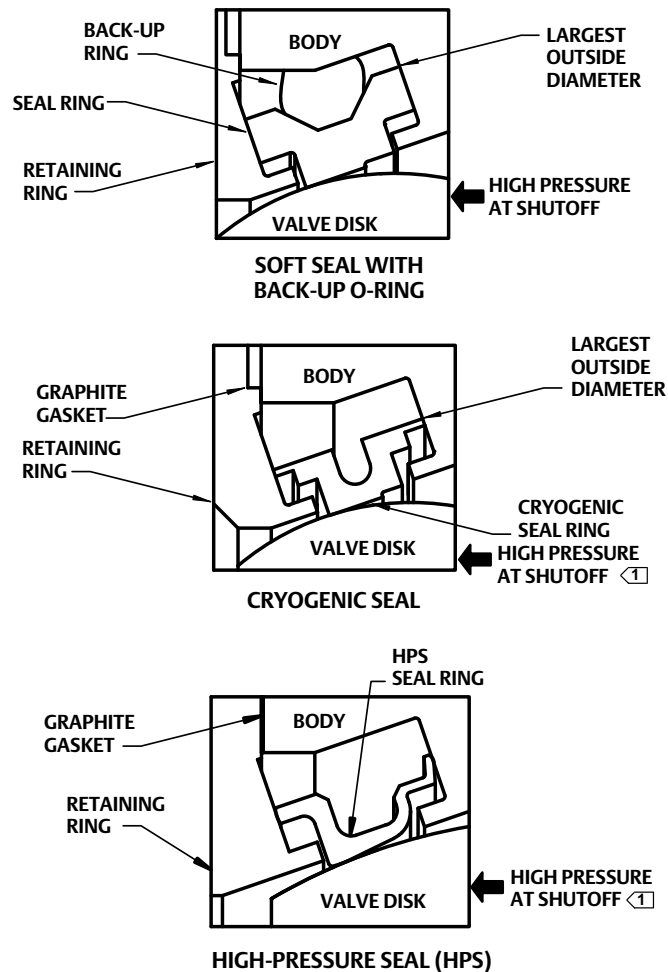


STANDARD SQUARE TYPE JAM PACKING WITH LANTERN RING/ BEARING LUBRICATION CONNECTION

## Seal Maintenance

1. After the valve has been removed from the line and the manual or power actuator has been removed, manually rotate the shaft (key 4) counter-clockwise until the disk has moved a full 180°. Note the “S” on the shaft is 180° from the “S” on the valve body.

Figure 7. Seal Configurations



E1701

Notes:

- 1 This unidirectional seal must be installed so the ring is downstream from the high pressure side of the valve at shutoff, as shown.

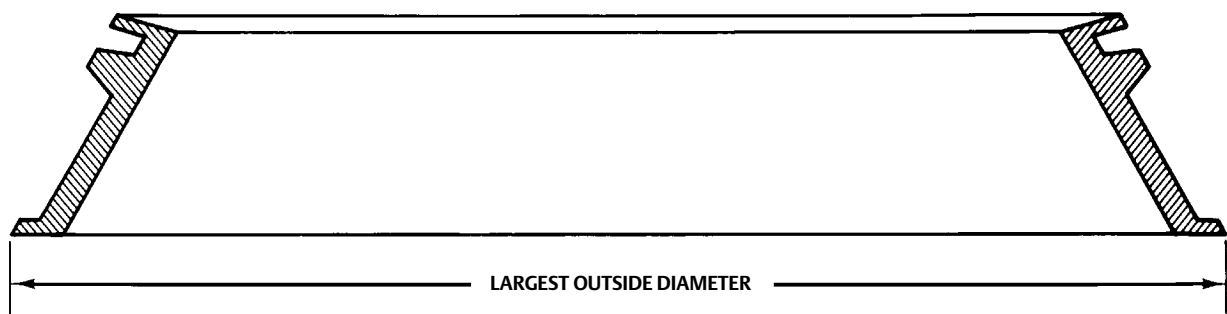
2. Lay the valve flat on a work bench in a secure position with the retaining ring (key 2) and retaining ring screws (key 22) facing up. Use blocks or other appropriate techniques to support the valve. Remove all retaining ring screws.
3. Remove the retaining ring by placing a retaining ring screw in each of the two retaining ring jack screw holes. With the appropriate tool, slowly rotate the screws until the retaining ring has been lifted from the valve body.

**CAUTION**

In the following step, use the appropriate tool to avoid damage to the seal or T-slot area of the valve.

4. Different valve types have different seal designs and components. To see the appropriate seal, refer to figure 7. Insert the appropriate tool under the top edge of seal and gently pry the seal out. Take care not to damage the seal or T-slot area of the valve body. After the seal has been removed, clean the T-slot area, retaining ring and, if required, polish the disk thoroughly with fine steel wool or other appropriate material.

Figure 8. Typical Seal Ring (Sectional)



### Soft Seal Installation

1. Locate the replacement seal ring (key 8) and note the shape of the ring. The ring is wider across one edge diameter and narrower across the other edge diameter as shown in figure 8. Around the outside circumference is one wide groove.

Before installing the seal ring into the valve body, the backup ring (key 9) must first be placed onto the wide, outer groove of the seal ring.

2. The seal ring and backup ring assembly must be installed in the valve. The wider outside diameter of the seal ring goes into the T-slot area of the valve body, shown in figure 9. Start the wider diameter edge of the seal ring into the T-slot of the valve body using a blunt end screwdriver.
3. Carefully tuck the backup ring downward into the valve body T-slot until the seal ring and back-up ring are completely entrapped in the valve body T-slot.
4. When the seal is thoroughly seated, re-install the retaining ring and screws. Tighten the retaining screws just enough to eliminate vertical movement of the retaining ring. With the use of the blunt end tool, carefully tuck the lip of the seal ring under the retaining ring.
5. When the seal is under the lip of the retaining ring, tighten the screws according to standard procedures. Manually rotate the valve shaft clockwise 180° to return the disk to its closed position against the internal stop.
6. The final seating of the retaining ring screws can now be done. For the screw torque values, refer to table 6. The seal is now fully installed and the valve may be closed for installation or storage.

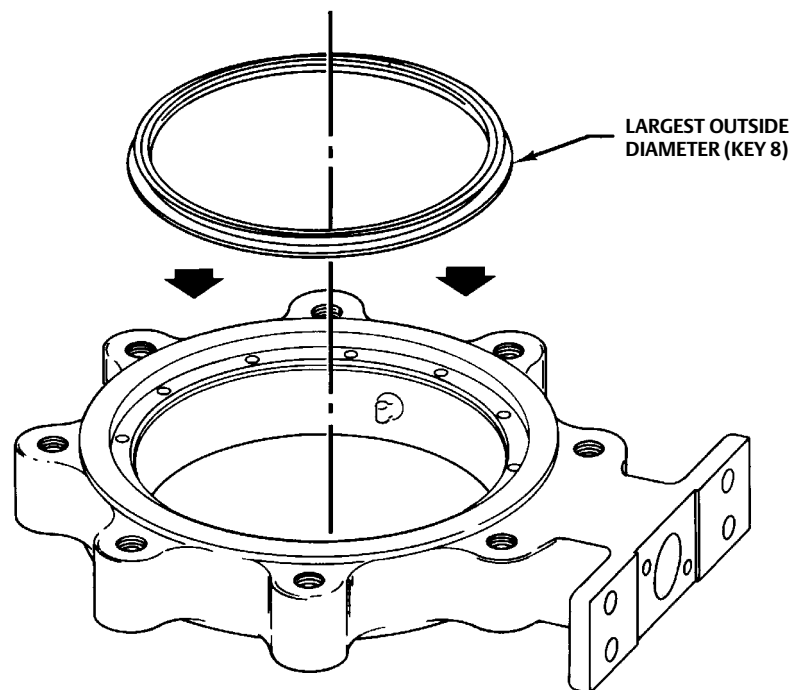
## Seal Installation

For HPS seal installation:

Locate the replacement seal ring (key 8) and note the shape of the ring. The ring is wider across one edge diameter and narrower across the other edge diameter as shown in figure 8. Around the outside circumference is one wide groove.

Install the seal ring (key 8) into the valve body by first placing the wider outside diameter of the seal ring into the T-slot area of the valve body which is shown in figure 9.

Figure 9. Typical Seal Installation



A5251/JL

For Soft seal installation:

1. Locate the replacement seal ring (key 8) and note the shape of the ring. The ring is wider across one edge diameter and narrower across the other edge diameter as shown in figure 8. Around the outside circumference is one wide groove.

Install the seal ring in the valve body by first placing the wider outside diameter of the seal ring, as marked in figure 8, into the T-slot area of the valve body which is shown in figure 9. Seal rings without a back-up ring will fall into place. The back-up ring will have to be installed after placing the seal ring in the valve using a blunt end screwdriver. Do not use the screwdriver or seal tool directly on the seal ring. Use a tool only on the backup ring.

2. With the seal ring inserted all the way around the valve body T-slot now lay the backup ring into the opening between the valve body and the seal ring. Use the seal tool to apply pressure to the backup ring and carefully tuck the backup ring down into the T-slot between the valve body and the seal ring. Note: On larger valves, it may be more efficient to have someone hold down the seal ring while the backup ring is pushed into the T-slot.
3. Once the seal ring or seal and backup ring has been fully installed into the valve body T-slot, the retaining ring gasket (key 17) can be installed.



**CAUTION**

**This gasket is a thin graphite material. Take care to avoid damaging the gasket. However, punch one initial screw hole through the gasket for alignment purposes.**

4. Install the retaining ring and align the screw holes in the retaining ring with the holes in the valve body. Install the first retaining ring screw through the punched hole in the ring gasket. Install the other ring screws by pushing the screws through the graphite gasket and threading them into valve body.
5. Tighten the retaining ring screws just enough to eliminate vertical movement of the retaining ring. Do not tighten the retaining ring screws.

**⚠ WARNING**

**Avoid personal injury or property damage caused by the impact of a falling or tipping large valve. Large valves must be properly supported during maintenance.**

6. To complete this step, stand the valve up. Support the valve securely using methods appropriate for the valve size.

**CAUTION**

**If a vise or other clamps are being used, be sure damage is not done to the flange gasket sealing area of the valve body.**

7. Manually rotate the valve shaft to turn the disk clockwise to meet the seal.
8. Tap the disk with a rubber mallet to drive it against the internal travel stop. When the disk makes contact with the stop, manually rotate the disk counter-clockwise back out of the seal to a 90° open position. Repeat steps 7 and 8 three times.
9. The final seating of the retaining ring screws can be done. For the screw torque values, refer to table 6. The seal is now fully installed and the valve may be closed for installation or storage.

**Cryogenic Seal Installation**

1. Locate the replacement seal ring (key 8) and note the shape of the ring. The ring is wider across one edge diameter and narrower across the other edge diameter as shown in figure 8. Around the outside circumference is one wide groove.

**For Kel-F seals with aluminum backup rings only:** Now, locate the replacement V-ring. Please notice that the V-ring is similar in diameters to the seal ring. Place the V-ring down onto the seal ring with the larger diameter of the V-ring going first. Be sure the larger diameters on both rings are down.

2. **For all types:** Install the seal ring (or seal ring and V-ring) in the valve body by first placing the wider outside diameter of the seal ring into the T-slot area of the valve body. The seal ring with or without a back-up ring will fall into place.
3. Once the seal ring (or seal ring and V-ring) have been fully installed into the valve body T-slot, the retaining ring gasket can be installed.

**CAUTION**

**This gasket is a thin graphite material. Take care to avoid damaging the gasket. However, punch one initial screw hole through the gasket for alignment purposes.**

4. Install the retaining ring and align the screw holes in the retaining ring with the holes in the valve body. Install the first retaining ring screw through the punched hole in the ring gasket. Install the other ring screws by pushing the screws through the graphite gasket and threading them into the screw holes in the valve body.
5. Tighten the retaining ring screws just enough to eliminate vertical movement of the retaining ring. Do not tighten the retaining ring screws.

### **⚠ WARNING**

**Avoid personal injury or property damage caused by the impact of a falling or tipping large valve. Large valves must be properly supported during maintenance.**

6. To complete this step, stand the valve up. Support the valve securely using methods appropriate for the valve size.

### **CAUTION**

**If a vise or other clamps are being used, be sure damage is not done to the flange gasket sealing area of the valve body.**

7. Manually rotate the valve shaft to turn the disk clockwise to meet the seal.
8. Tap the disk with a rubber mallet to drive it against the internal travel stop. When the disk makes contact with the stop, manually rotate the disk counter-clockwise back out of the seal to a 90° open position. Repeat steps 7 and 8 three times.
9. The final seating of the retaining ring screws can be done. For the screw torque values, refer to table 4. The seal is now fully installed and the valve may be closed for installation or storage.

## Valve Shaft/Disk Pin Unit Maintenance

### Valve Shaft/Disk Pin Unit Removal

1. Rotate the disk (key 3) 180° counterclockwise from the full closed position.
2. Place the open valve horizontally on a suitable work surface with the retaining ring (key 2) facing upward. Be sure to properly support the valve with blocks while the shaft is being removed.

### Note

The disk must be removed from the waterway side of the valve body, which is the side opposite the T-slot area. Support the valve and disk so the disk can be easily removed from the valve when the shaft is removed.

3. Use a pin extractor to remove the disk pins (key 6). Select the proper pin extractor tip with screws of proper thread size to match the thread size in the disk pins.
4. Screw the pin extractor tip into the pin as far as possible. With an upward, straight sliding motion, extract the pin. Repeat the same procedure for the other pins.

A threaded rod with an appropriate spacer and nut can also be used as an extractor tool. If using a threaded rod, choose a rod with threads that fit the inside threads of the pins. The rod should extend several inches above the disk when screwed into a pin.

5. After screwing the rod into the pin, slide the spacer over the rod and pin. Thread the nut onto the rod and tighten. As the nut is tightened, it will drive the spacer against the disk and the increasing pressure will draw the pin from the disk.
6. Loosen the packing nuts (key 16).

7. Extract the shaft (key 4) by hand-pulling or by using the pin extractor screwed into the end of the shaft.

**Table 4. Torque Values for Fasteners**

Fastener Nominal Size	N•m	In•lb	Ft•lb
#10	4	35	---
1/4	9	81	---
5/16	19	167	---
3/8	33	295	---
7/16	53	---	39
1/2	80	---	59
9/16	117	---	86
5/8	161	---	119
3/4	286	---	211
7/8	447	---	330
1	651	---	480
1-1/8	837	---	617

**CAUTION**

**In the following step, remove the disk from the waterway side of the valve to avoid damage to the disk or T-slot area.**

8. Remember: the disk must be removed from the waterway side of the valve. Do not try to force the disk through the seal side of the valve. This could cause severe damage to the disk and T-slot area.

After removing the shaft, remove the disk.

**Valve Shaft/Disk Pin Unit Installation**

**Note**

Replacement disk and shaft(s) are provided as a matched set. When replacing either the disk or shaft(s), a matched set is required.

To replace the disk pin assembly (key 6), reverse the removal steps used above.

Before placing disk into a valve body, properly align the top of the disk with the top of the valve. A "T" is stamped on the disk to indicate alignment. Be sure holes in the shaft are exactly aligned with the holes in the disk before re-installing pins. After pins are fully seated in the disk, use a punch or small chisel to stake the pins at three points. This will prevent the pins from working free and out of the disk due to vibration.

**Bearing Maintenance**

**Bearing Removal**

To get access to the bearings (key 10), the disk and shaft assembly (keys 3, 4 and 5) must be removed from the valve. The bearings (key 10) may be removed by using a brass drift punch and lightly tapping them out. In valves without lower bonnets, the lower bearing is removed by grasping it and pulling upwards. Also, cryogenic valves have an outboard bearing under the packing. Refer to the Packing Maintenance section for instructions.

**Bearing Installation**

Before installation of the bearings, bearing bores should be solvent cleaned and bearings will slip in.

## Parts Ordering

### **⚠ WARNING**

Use only genuine Fisher replacement parts. Components that are not supplied by Emerson Automation Solutions should not, under any circumstances, be used in any Fisher instrument. The use of components not manufactured by Emerson Automation Solutions may void your warranty, might adversely affect the performance of the instrument, and could result in personal injury or property damage.

## Parts List

### Note

Contact your [Emerson sales office](#) for Part Ordering information.

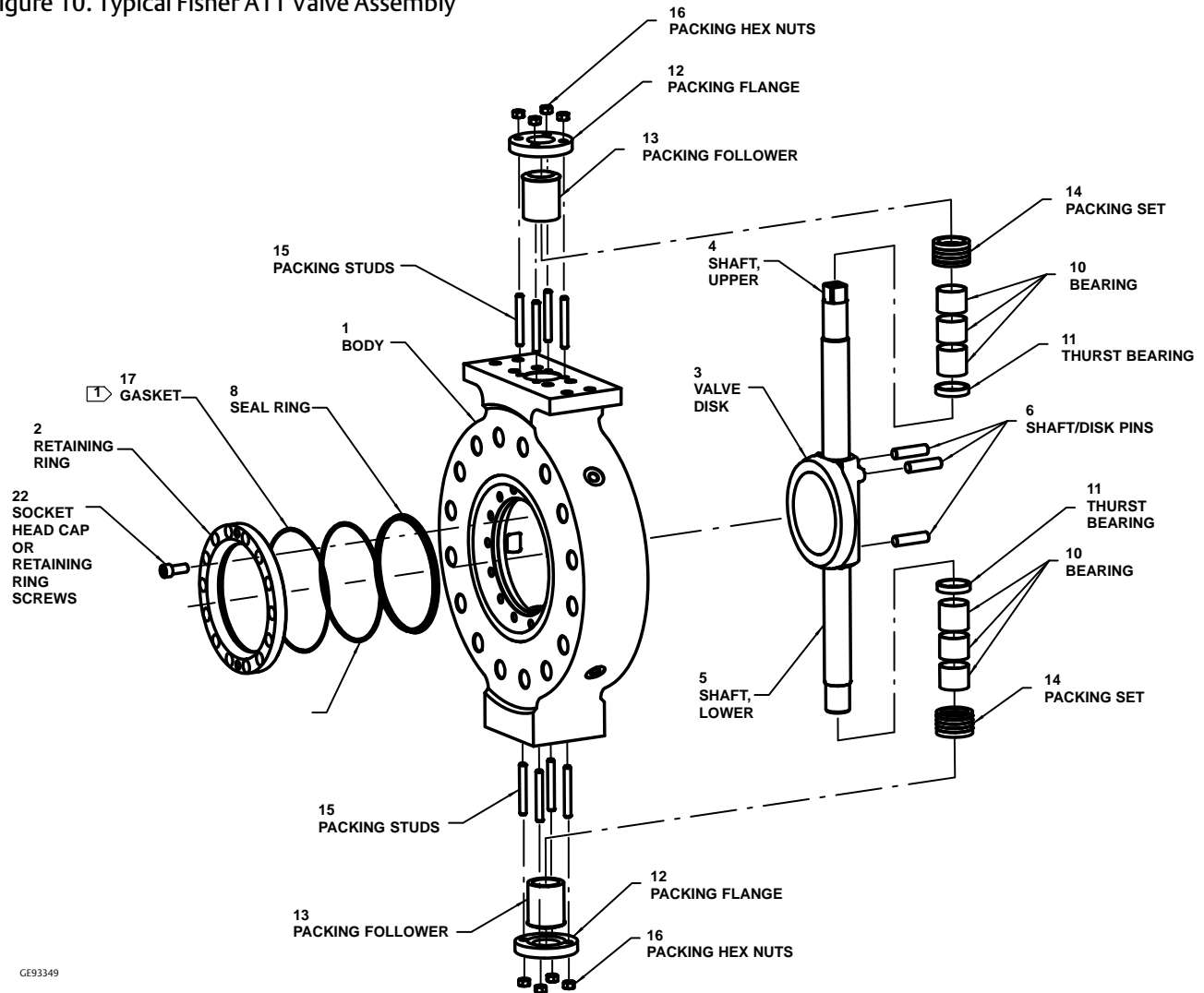
Key	Description
1	Valve Body
2	Retaining Ring
7*	Key (Not Shown)
8*	Seal Ring
9	Back-up Ring
10*	Bearing
11*	Thrust Bearing (Not Shown)
12	Packing Flange
13	Packing Follower
14*	Packing Set
15	Stud
16	Hex Nut
17*	Gasket (Retainer Ring) w/Metal and Phoenix III Seals
20	Lockwasher, retaining ring assembly S31600
20	Lockwasher, packing assembly
21	Hex Head Bolt (Not Shown)
22	Socket Head Cap or Retaining Ring Screws
24	Nameplate (Not shown)
26	Packing Spacer (Not shown)
27	Drive Screw (Not Shown)
28*	Disk/Shaft Assembly
29	Label
33	Flow Arrow (Not Shown)
---	Line Bolting

## ENVIRO-SEAL Packing Parts

Parts shown are used in standard and NACE constructions.

Key	Description
100	Stud
101	Hex Nut
102	Packing Flange
103	Spring Pack
105*	Packing Set
106*	Anti-Extrusion Ring (2 req'd)
107	Packing Box Ring
111	Tag
112	Cable Tie
113	Lubricant

Figure 10. Typical Fisher A11 Valve Assembly



GE93349

Note:  
 1 Not required for soft seated valves.





Neither Emerson, Emerson Automation Solutions, nor any of their affiliated entities assumes responsibility for the selection, use or maintenance of any product. Responsibility for proper selection, use, and maintenance of any product remains solely with the purchaser and end user.

ENVIRO-SEAL and Fisher are marks owned by one of the companies in the Emerson Automation Solutions business unit of Emerson Electric Co. Emerson Automation Solutions, Emerson, and the Emerson logo are trademarks and service marks of Emerson Electric Co. All other marks are the property of their respective owners.

The contents of this publication are presented for informational purposes only, and while every effort has been made to ensure their accuracy, they are not to be construed as warranties or guarantees, express or implied, regarding the products or services described herein or their use or applicability. All sales are governed by our terms and conditions, which are available upon request. We reserve the right to modify or improve the designs or specifications of such products at any time without notice.

Emerson Automation Solutions  
Marshalltown, Iowa 50158 USA  
Sorocaba, 18087 Brazil  
Cernay, 68700 France  
Dubai, United Arab Emirates  
Singapore 128461 Singapore

[www.Fisher.com](http://www.Fisher.com)

